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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Wenli Cai

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EXAMINER

COUSO, JOSE L

ART UNIT

PAPER NUMBER

2624

MAIL DATE

DELIVERY MODE

07/12/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/580,772	Applicant(s) CAI ET AL.	
	Examiner Jose L. Couso	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-55 is/are pending in the application.
4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-43 and 51-55 is/are rejected.
- 7) ☒ Claim(s) 44-50 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

Art Unit: 2624

1. Claims 1-33 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. Supreme Court precedent¹ and recent Federal Circuit decisions² indicate that a statutory “process” under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claim(s) recite a series of steps or acts to be performed, the claim(s) neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. For example the method including steps of providing, initializing, determining and evaluating is of sufficient breadth that it would be reasonably interpreted as a series of steps completely performed mentally, verbally or without a machine. The Applicant has provided no explicit and deliberate definitions of “providing”, “initializing”, “determining” and “evaluating” to limit the steps and the claim language itself is sufficiently broad to read on a person mentally going through the steps.

The examiner suggests amending the body of the claims to include a computer or processor carrying out the steps of the method.

¹ *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

² *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

Art Unit: 2624

2. The following is a quotation of the appropriate paragraphs of 35

U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-10, 18-22, 34-43 and 51-55 are rejected under 35 U.S.C. 102(e) as being anticipated by Zarkh et al. (U.S. Patent No. 7,742,629).

With regard to claims 1 and 34, Zarkh describes providing a digital image of a vessel wherein said image comprises a plurality of intensities corresponding to a domain of points in a D -dimensional space (see for example figures 29-32); initializing a centerline comprising a plurality of points in the vessel (refer for example to column 12, lines 27-29); determining a cross section of the vessel at each point in the centerline (refer for example to column 12, lines 35-38); evaluating a center point for each cross section of the vessel (refer for example to column 16, lines 19-21); and determining a refined centerline from the center points of each cross section (refer for example to column 16, lines 21-31).

As to claims 2 and 35, Zarkh describes wherein the steps of determining a cross section, evaluating a center point, and determining the refined centerline are repeated until the difference between each pair of successive refined centerlines is less than a predetermined quantity (refer for example to column 16, lines 32-39).

Art Unit: 2624

In regard to claims 3 and 36, Zarkh describes wherein the cross section at a point in the centerline is determined by finding a cross section intersecting the centerline with a minimal area (refer for example to column 16, lines 32-39).

With regard to claims 4 and 37, Zarkh describes wherein the cross section with minimal area is the cross section with the shortest lines intersecting the point in the centerline (refer for example to column 16, lines 40-59).

As to claims 5 and 38, Zarkh describes wherein the cross section at a point on the centerline is perpendicular to a tangent vector of the centerline at the point on the centerline (refer for example to column 16, lines 40-59).

In regard to claims 6 and 39, Zarkh describes associating a reference frame to each cross section, wherein each said reference frame is defined by the centerline point in the cross section, and three orthogonal vectors that define an orientation of the reference frame, wherein the three orthogonal vectors include a tangent to the centerline at the centerline point, and two other orthogonal vectors in the plane of the cross section (refer for example to column 18, lines 37-62).

With regard to claims 7 and 40, Zarkh describes wherein a first referenced frame can be determined from the centerline point in the cross section and the three orthogonal vectors, and a next reference frame can be determined by displacing the first reference frame to a next centerline point and rotating the displaced reference frame to align with the three orthogonal vectors of the cross section associated with the next centerline point (refer to column 22, lines 3-61).

As to claims 8 and 41, Zarkh describes wherein evaluating a center point of each cross section comprises finding the contour of the cross section and

Art Unit: 2624

using the contour to locate the centerpoint of the cross section (refer for example to column 22, lines 3-61).

In regard to claims 9 and 42, Zarkh describes wherein evaluating a center point of each cross section comprises calculating a centroid of each cross section (refer for example to column 22, lines 3-61).

With regard to claims 10 and 43, Zarkh describes calculating the covariance matrix for each cross section, and calculating the eigenvalues and eigenvectors of the covariance matrix to determine the shape of the cross section (refer for example to column 23, lines 3-15).

As to claims 18 and 51, Zarkh describes calculating the lumen and wall contours on each cross-section, as well as other geometric information about these two contours (refer for example to column 22, lines 3-61).

In regard to claims 19 and 52, Zarkh describes the step of providing an endoluminal flight along the centerline of a vessel object, displaying hard plaque and soft plaque in different colors for differentiation from the vessel wall (refer for example to column 22, lines 3-61).

With regard to claims 20 and 53, Zarkh describes moving back and forth along the centerline by direct manipulation of a mechanism (refer for example to column 10, lines 30-40 and column 25, lines 17-42).

As to claims 21 and 54, Zarkh describes wherein the mechanism includes clicking or dragging a mouse along an overview of the entire vessel or scrolling a

Art Unit: 2624

mouse wheel to scroll along the centerline of the vessel (refer for example to column 10, lines 30-40 and column 25, lines 17-42).

In regard to claims 22 and 55, Zarkh describes wherein the mechanism includes interactively tilting a viewpoint without leaving the centerline of the vessel (refer for example to column 10, lines 30-40 and column 25, lines 17-42).

4. Claims 44-50 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Carroll et al., Chen et al., Pichon et al., Lesage et al. and Florin et al. all disclose systems similar to applicant's claimed invention.

Art Unit: 2624

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jose L. Couso whose telephone number is (571) 272-7388. The examiner can normally be reached on Monday through Friday from 6:30 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella, can be reached on (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Jose L. Couso/
Primary Examiner, Art Unit 2624
July 8, 2010